

Anatomy and Physiology  
Chapter 5: The Skeletal System

Name: \_\_\_\_\_

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**Objectives-** By the end of this chapter I will be able to:

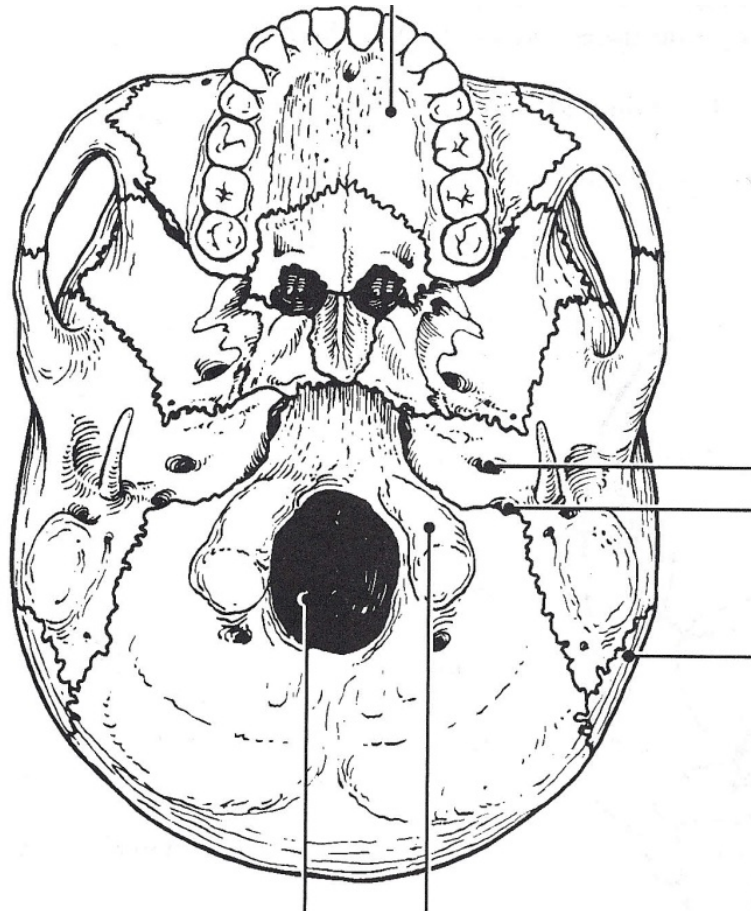
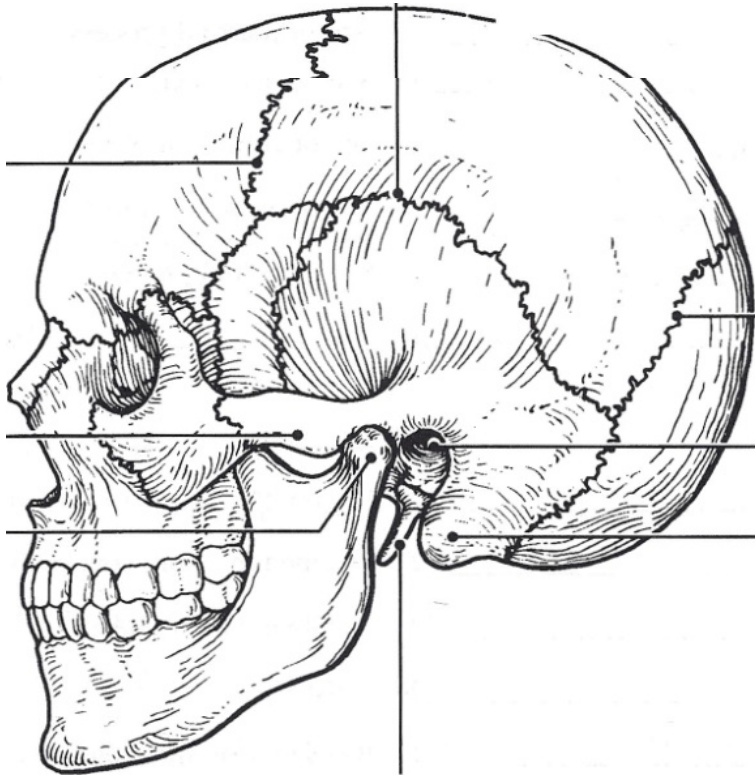
1. Identify the subdivisions of the skeleton as axial or appendicular.
2. List at least three functions of the skeletal system.
3. Name the four main classifications of bone.
4. Identify the major anatomical areas of a long bone.
5. Explain the role of bone salts and the organic matrix in making bone both hard and flexible.
6. Describe briefly the process of bone formation in the fetus, and summarize the events of bone remodeling throughout life.
7. Name and describe the various types of fractures.
8. Identify and name the bones of the skull.
9. Describe how the skull of a newborn infant (or fetus) differs from that of an adult, and explain the function of fontanel.
10. Name the parts of a typical vertebra, and explain in general how the cervical, thoracic, and lumbar vertebrae differ from one another.
11. Identify the bones of the shoulder and pelvic girdles and their attached limbs.
12. Describe differences between a male and female pelvis.
13. Name the three major categories of joints, and compare the amount of movement allowed by each.
14. Identify some of the causes of bone and joint problems throughout life.

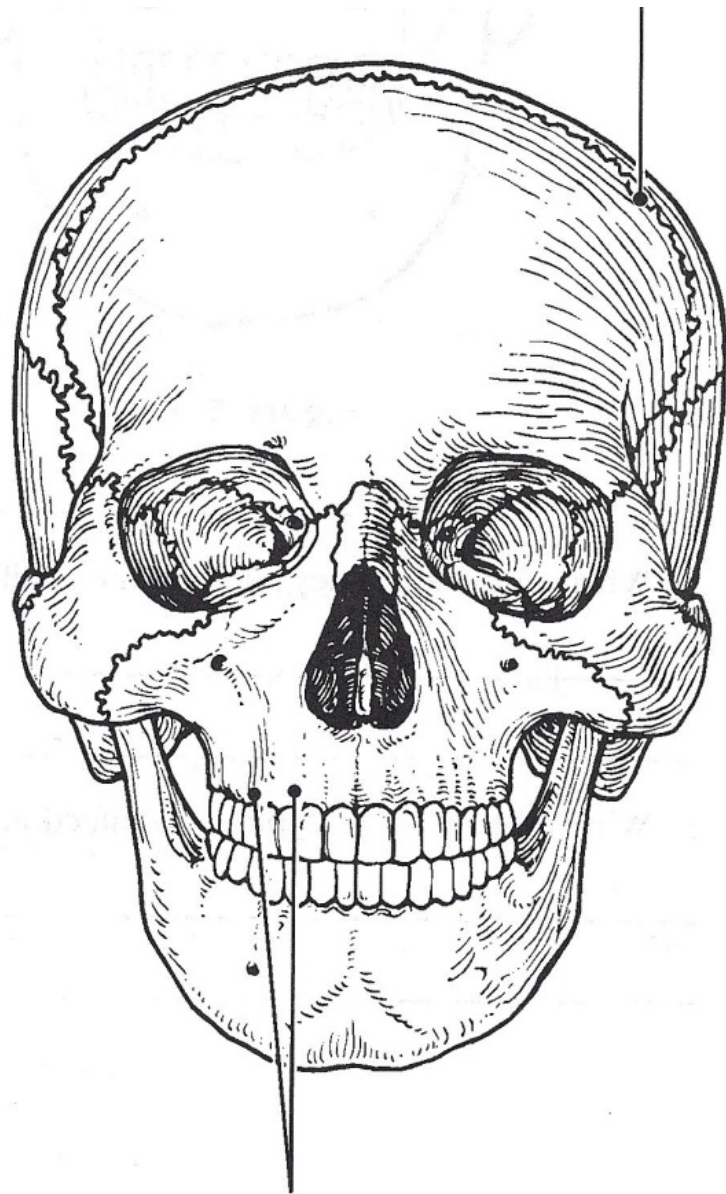
**Objectives continued-** Answer each of the objectives on a separate sheet of paper to demonstrate content mastery. Attach answers to back of packet.

**Notes Outline**

- I. Skeletal system
- II. Classification of bone on basis of shape
- III. Anatomy of lone bone
- IV. Bone markings
- V. Microscopic anatomy of bone
- VI. Formation of human skeleton
- VII. Axial skeleton
- VIII. Appendicular skeleton
- IX. Joints
- X. Developmental aspects of skeletal system

Each of the following pictures indicates lateral, anterior, and inferior views of the skull. Color code bones and label bone





1. Classify each of the following terms as a projection (P) or a depression or opening (D) Enter the appropriate letter in the answer blanks

Condyle		Crest		Fissure	
Head		Meatus		Ramus	
Tuberosity		Foramen		Spine	

2. Group each of the following bones into one of the four major bone categories. L for long, S for short, F for flat, and I for irregular

Calcaneus		Frontal		Femur	
Humerus		Mandible		Metacarpal	
Radius		Sternum		Vertebra	

3. Characterize the following statements relating to long bones. Use these terms: *Diaphysis, epiphysis, yellow marrow cavity, epiphyseal plate, red marrow*

- A. Site of spongy bone in adult \_\_\_\_\_
- B. Site of compact bone in adult \_\_\_\_\_
- C. Site of hematopoiesis in adult \_\_\_\_\_
- D. Scientific name for bone shaft \_\_\_\_\_
- E. Site of fat storage in adult \_\_\_\_\_
- F. Site of longitudinal growth in child \_\_\_\_\_

4. Complete the following statements using terms provided in key. *gravity, osteoclasts, osteoblasts, osteocytes,*

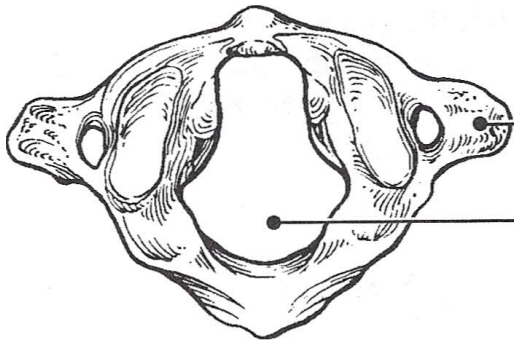
- A. Mature bone cells, called \_\_\_\_\_, maintain bone in a viable state.
- B. Immature, or matrix-depositing, bone cells are referred to as \_\_\_\_\_.
- C. Bone cells that liquefy bone matrix and release calcium to the blood are called \_\_\_\_\_.
- D. Our astronauts must do isometric exercises when in space because bones atrophy under conditions of weightlessness or lack of \_\_\_\_\_.

7. Using the key choices, identify the bones indicated by the following descriptions. Fill in using letters

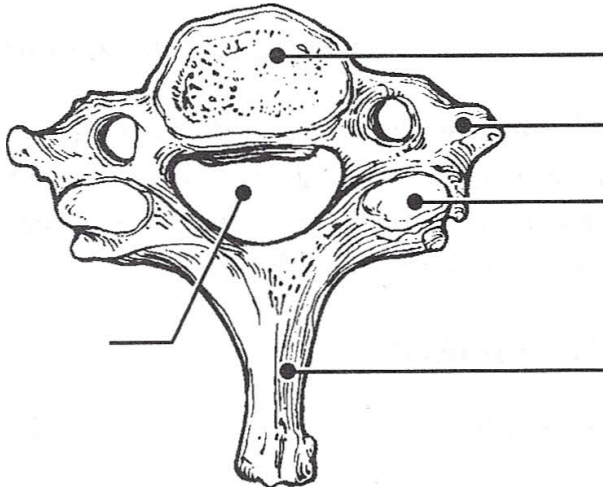
A. ethmoid	B. Frontal	C. Hyoid	D. Lacrimals
E. Mandible	F. Maxillae	G. Nasals	H. Occipital
I. Palatines	J. Parietals	K. Sphenoid	L. Temporals
M. Vomer	N. Zygomatic		

- 1. \_\_\_\_ Forehead bone
- 2. \_\_\_\_ Cheekbone
- 3. \_\_\_\_ Lower jaw
- 4. \_\_\_\_ Bridge of nose
- 5. \_\_\_\_ Posterior part of hard palate
- 6. \_\_\_\_ Much of the lateral and superior cranium
- 7. \_\_\_\_ Most posterior part of cranium
- 8. \_\_\_\_ Single, irregular, bat-shaped bone, forming part of the cranial floor
- 9. \_\_\_\_ Tiny bones, bearing tear ducts
- 10. \_\_\_\_ Anterior part of hard palate
- 11. \_\_\_\_ Superior and middle nasal conchae formed from its projections
- 12. \_\_\_\_ Site of mastoid process
- 13. \_\_\_\_ Site of mental foramen
- 14. \_\_\_\_ Site of styloid process
- 15. \_\_\_\_, 16 \_\_ 17. \_\_\_\_ 18. \_\_\_\_ Four bones containing paranasal sinuses
- 19. \_\_\_\_ Its condyles articulate with the atlas
- 20. \_\_\_\_ Foramen magnum contained here
- 21. \_\_\_\_ Middle ear found here
- 22. \_\_\_\_ Nasal septum
- 23. \_\_\_\_ Site of external acoustic meatus

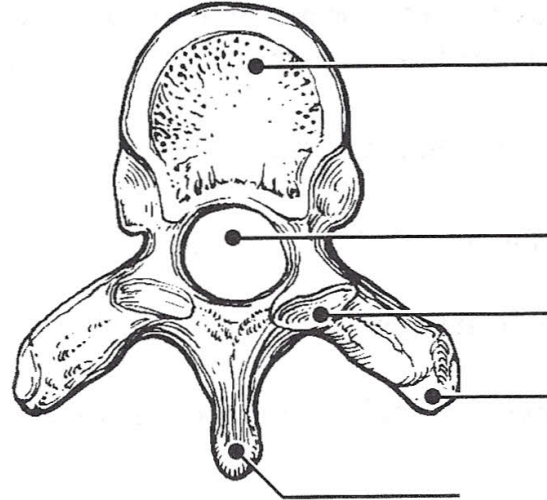
10. The pictures above show superior views of four types of vertebrae. In spaces provided below indicate which region of the spinal column it would be found, identify also vertebral body, spinous and transverse process, superior articular processes, and vertebral foramen



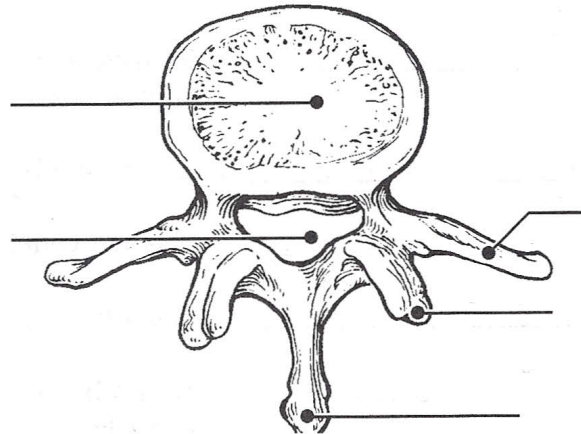
A. \_\_\_\_\_



B. \_\_\_\_\_



C. \_\_\_\_\_



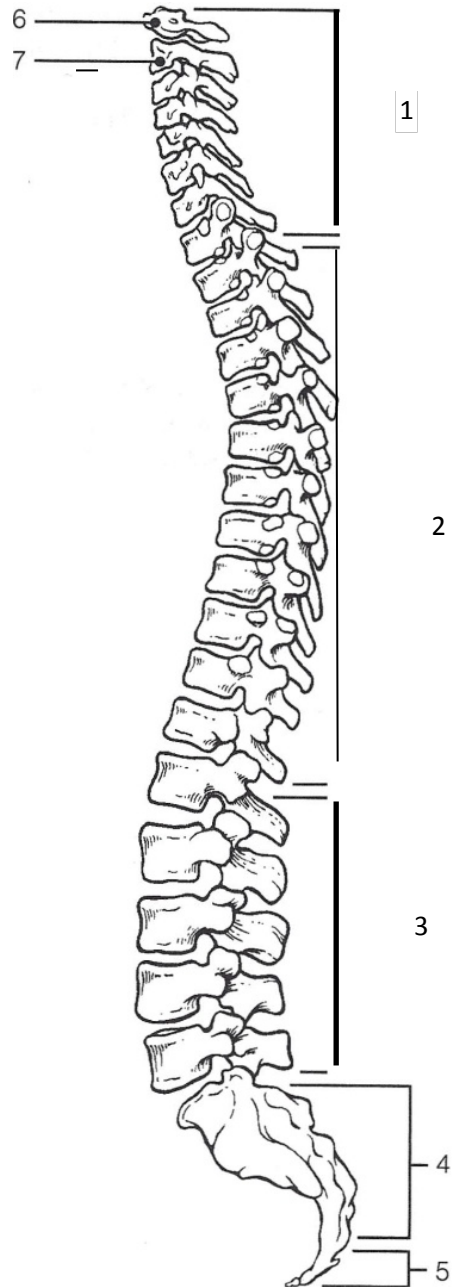
D. \_\_\_\_\_

8. Correctly identify the vertebral parts/areas described as follows:

- A. Structure that encloses nerve cord \_\_\_\_\_
- B. Weight-bearing part of vertebra \_\_\_\_\_
- C. Provide(s) levers for muscles to pull against \_\_\_\_\_
- D. Provide(s) an articulation point for the ribs \_\_\_\_\_
- E. Openings allowing spinal nerves to pass \_\_\_\_\_

9. The following statements provide distinguishing characteristics of the vertebrae identify each structure using these terms: *atlas*, *axis*, *cervical vertebra*, *coccyx*, *lumbar vertebra*, *sacrum*, *thoracic vertebra*

- A. Type of vertebra(e) containing foramina in the transverse processes, through which the vertebral arteries ascend to reach the brain. \_\_\_\_\_
- B. Its dens provides a pivot for rotation of the first cervical vertebra \_\_\_\_\_
- C. Transverse processes have facets for articulation with ribs; spinous process points sharply downward \_\_\_\_\_
- D. Composite bone; articulates with the hip bone laterally \_\_\_\_\_
- E. Tailbone; vestigial fused vertebra \_\_\_\_\_
- F. Supports the head; allows the rocking motion of the occipital condyles \_\_\_\_\_
- G. Seven components; unfused \_\_\_\_\_
- H. Twelve components; unfused \_\_\_\_\_

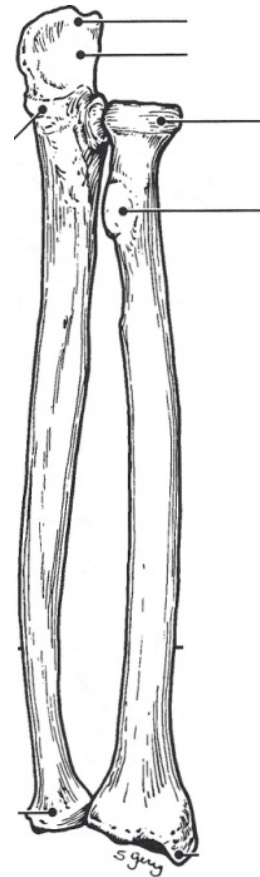
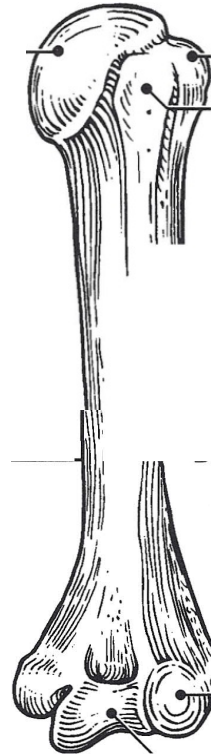
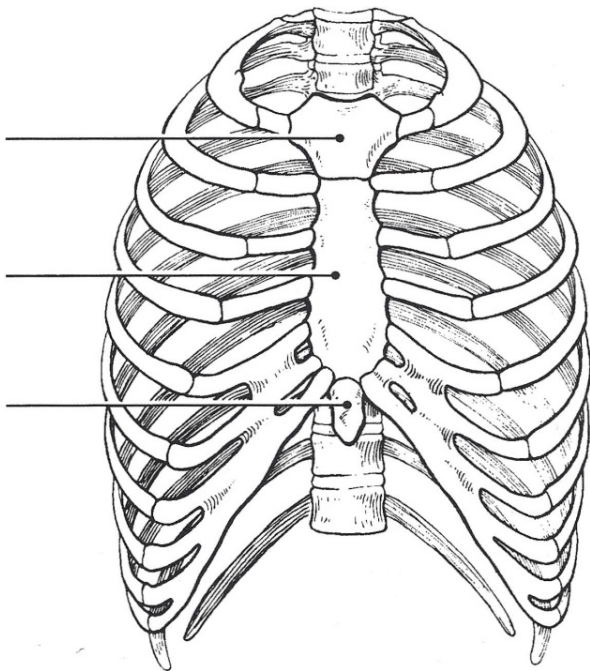


11. The figure below is a lateral view of the vertebral column. Identify each number region of the column by listing in the numbered answer blanks the region name first and then the specific vertebrae involved example: sacral region, S#, S#

- 1. \_\_\_\_\_
- 2. \_\_\_\_\_
- 3. \_\_\_\_\_
- 4. \_\_\_\_\_
- 5. \_\_\_\_\_
- 6. \_\_\_\_\_
- 7. \_\_\_\_\_

12. The figure below is an anterior view of the thoracic cage. Select different colors to identify the structures below and color the coding circles and corresponding structures. Label subdivisions of sternum indicated by leader lines

- All true ribs
- Costal cartilages
- All false ribs
- Sternum

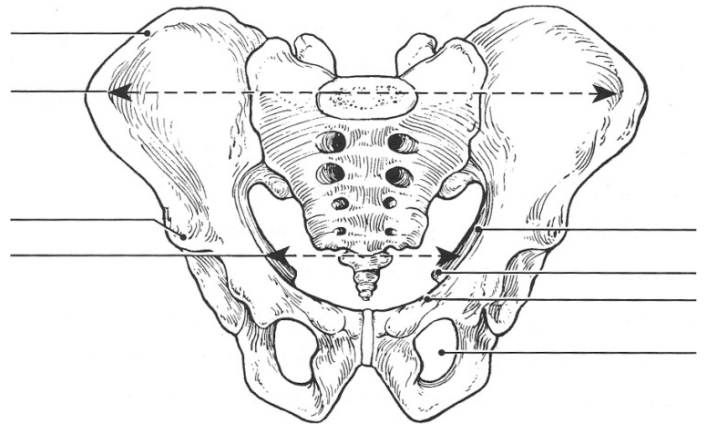


3. Identify the bones below by labeling the three different bones. Using the following terms, complete the illustration by labeling all bone markings provided with leader lines. (*Trochlear notch, trochlea, radial tuberosity, capitulum, deltoid tuberosity, head (three), styloid process, coronoid process, olecranon process, greater tubercle, lesser tubercle*)

14. Identify bone names or markings according to the descriptions below:

- A. Raised area on lateral surface of humerus to which deltoid muscle attaches  
\_\_\_\_\_
- B. Arm bone \_\_\_\_\_
- C. Bones composing the shoulder girdle \_\_\_\_\_ and \_\_\_\_\_
- D. Forearm bones \_\_\_\_\_
- E. Point where scapula and clavical connect  
\_\_\_\_\_
- F. Shoulder girdle bone that has no attachment to the axial skeleton  
\_\_\_\_\_
- G. Shoulder girdle bone that articulates anteriorly with the sternum \_\_\_\_\_
- H. Socket in the scapula for the arm bone  
\_\_\_\_\_
- I. Process above the glenoid cavity that permits muscle attachment \_\_\_\_\_
- J. Commonly called the collarbone \_\_\_\_\_
- K. Distal medial process of the humerus; joins the ulna \_\_\_\_\_
- J. Medial bone of the forearm in anatomical position \_\_\_\_\_
- K. Rounded knob on the humerus that articulates with the radius \_\_\_\_\_
- L. Anterior depression; superior to the trochlea; receives part of the ulna when the forearm is flexed \_\_\_\_\_
- M. Forearm bone involved in formation of the elbow joint \_\_\_\_\_
- N. Bones that articulate with the clavical \_\_\_\_\_, and \_\_\_\_\_
- O. Bones of the wrist \_\_\_\_\_
- P. Bones of the fingers \_\_\_\_\_
- Q. Heads of these bones form the knuckles  
\_\_\_\_\_

15. Identify bones and markings indicated by leader lines on the figure. Label the dashed line showing the dimensions of the true pelvis and that showing the diameter of a false pelvis.



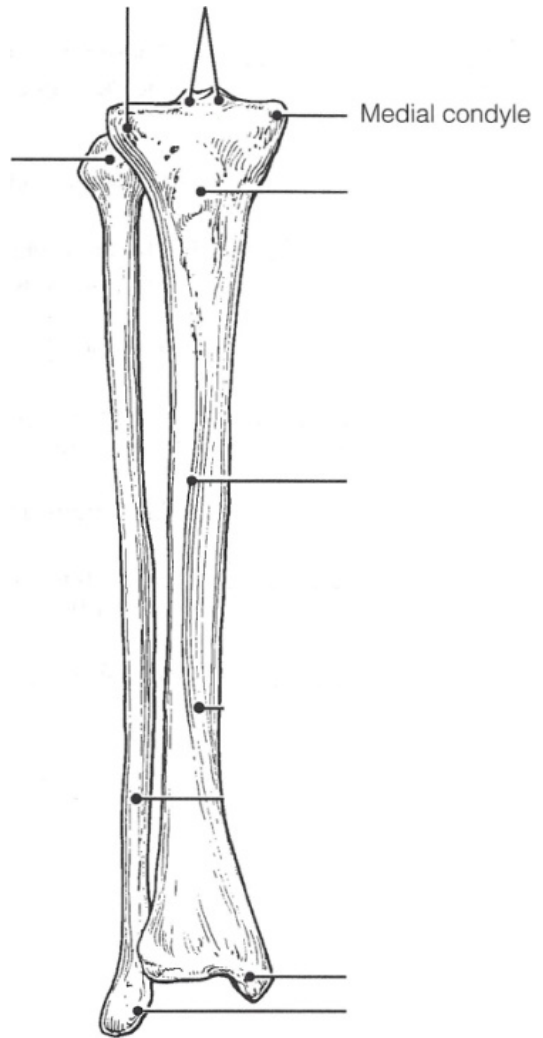
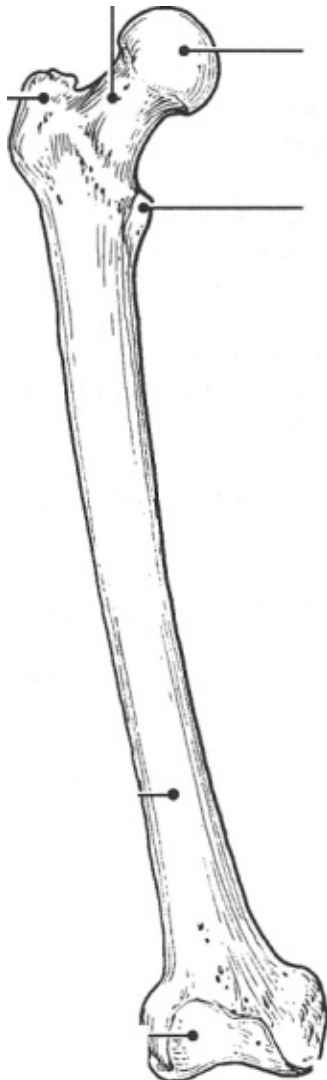
16. Identify the bone names and markings according to the descriptions below.

- A. Fuse to form the coxal bone (hip bone) \_\_\_\_\_
- B. Receives the weight of the body when sitting \_\_\_\_\_
- C. Point where the coxal bones join anteriorly \_\_\_\_\_
- D. Upper margin of iliac bones  
\_\_\_\_\_
- E. Deep socket in the hip bone that receives the head of the thigh bone  
\_\_\_\_\_
- F. Point where the axial skeleton attaches to the pelvic girdle  
\_\_\_\_\_
- G. Longest bone in body; articulates with the coxal bone  
\_\_\_\_\_
- H. Lateral bone of the leg  
\_\_\_\_\_
- I. Medial bone of the leg  
\_\_\_\_\_
- J. Bones forming the knee joints  
\_\_\_\_\_
- K. Point where the patellar ligament attaches \_\_\_\_\_
- L. Kneecap \_\_\_\_\_
- M. Shinbone \_\_\_\_\_

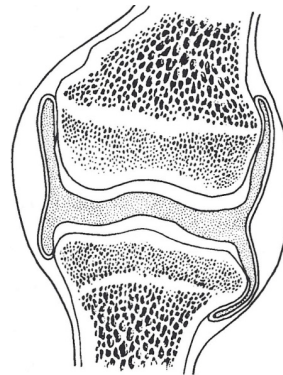


- N. Distal process on medial tibial surface \_\_\_\_\_
- O. Process forming the outer ankle \_\_\_\_\_
- P. Heel bone \_\_\_\_\_
- Q. Bones of ankle \_\_\_\_\_
- R. Bones forming the instep of the foot \_\_\_\_\_
- S. Opening in a coxal bone formed by the pubic and ischial rami \_\_\_\_\_

17. Identify each bone, and label the leader lines



19. The following structure of a typical diarthrotic joint. Identify each of the following areas using these terms (*articular cartilage of bone ends, fibrous capsule, synovial membrane, joint cavity*)



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20. For each joint described below, select an answer from Key A. Then if the Key A is other than a synovial joint, further classify using key B

A	A. Cartilaginous	B	1. Epiphyseal disk
	B. Fibrous		2. Suture
	C. Synovial		3. Symphysis

1. \_\_\_\_\_ Has amphiarthrotic and synarthrotic examples
2. \_\_\_\_\_ All have a fibrous capsule line with synovial membrane surrounding a joint cavity
3. \_\_\_\_\_ Bone regions united by fibrous connective tissue
4. \_\_\_\_\_ Joints between skull bones
5. \_\_\_\_\_ Joint between the atlas and axis
6. \_\_\_\_\_ Hip, elbow, knee
7. \_\_\_\_\_ All examples are diarthroses
8. \_\_\_\_\_ Pubic symphysis
9. \_\_\_\_\_ All are reinforced by ligaments
10. \_\_\_\_\_ Joint providing the most protection to underlying structures
11. \_\_\_\_\_ Often contains a fluid-filled cushion
12. \_\_\_\_\_ Child's long bone-growth plate made of hyaline cartilage
13. \_\_\_\_\_ Most joints and limbs
14. \_\_\_\_\_ Often associated with bursae
15. \_\_\_\_\_ Have the greatest mobility

21. Antonio is hit in the face with a football during practice. An X-ray reveals multiple fractures of the bones around an orbit. Name the bones that form margins of the orbit

22. Mrs. Brusio, a woman in her 80's is brought to the clinic with a fractured hip. X rays reveal compression fractures in her lower vertebral column and extremely low bone density in her vertebrae, hip bones, and femurs. What are the condition, cause and treatments?

23. Jack, a young man, is treated at the clinic for an accident in which he hit his forehead. When he returns for a checkup, he complains that he can't smell anything. X ray of his head reveals a fracture. Which part of bone was fractured to cause his loss of smell?

24. The serving arm of many tennis players is often significantly larger (thicker) than the other arm. Explain this phenomenon

## **Define Chapter 5 Vocabulary**

1. Axial skeleton
2. Appendicular skeleton
3. Skeletal system
4. Compact bone
5. Spongy bone
6. Long bone
7. Short bone
8. Flat bone
9. Irregular bone
10. Diaphysis
11. Periosteum
12. Perforating
13. Epiphyses
14. Articular cartilage
15. Epiphyseal line
16. Epiphyseal plate
17. Yellow marrow
18. Red marrow
19. Bone markings
20. Osteocytes
21. Lacunae
22. Lamellae
23. Haversian canals
24. osteon
25. Canaliculi
26. Perforating (Volkmann's)
27. Ossification
28. Osteoblasts
29. Osteoclasts
30. Bone remodeling